U.S. DEPARTMENT OF COMMERCE
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# Immediate Water Pollution Control Needs, Louisiana Coastal Waters, Louisiana

Federal Water Pollution Control Administration, Dallas, Tex

Apr 67

PB 266 385

# IMMEDIATE WATER POLLUTION CONTROL NEEDS

# LOUISIANA COASTAL WATERS

# LOUISIANA

U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTH CENTRAL REGION
DALLAS, TEXAS 75202

APRIL 1967

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16. ABSTRACT

The purpose of the report is to focus attention on known sources of pollution in this area and to provide a priority for action to correct existing problems and to prevent future problems.

17. KEY WORDS AND DOCUMENT ANALYSIS

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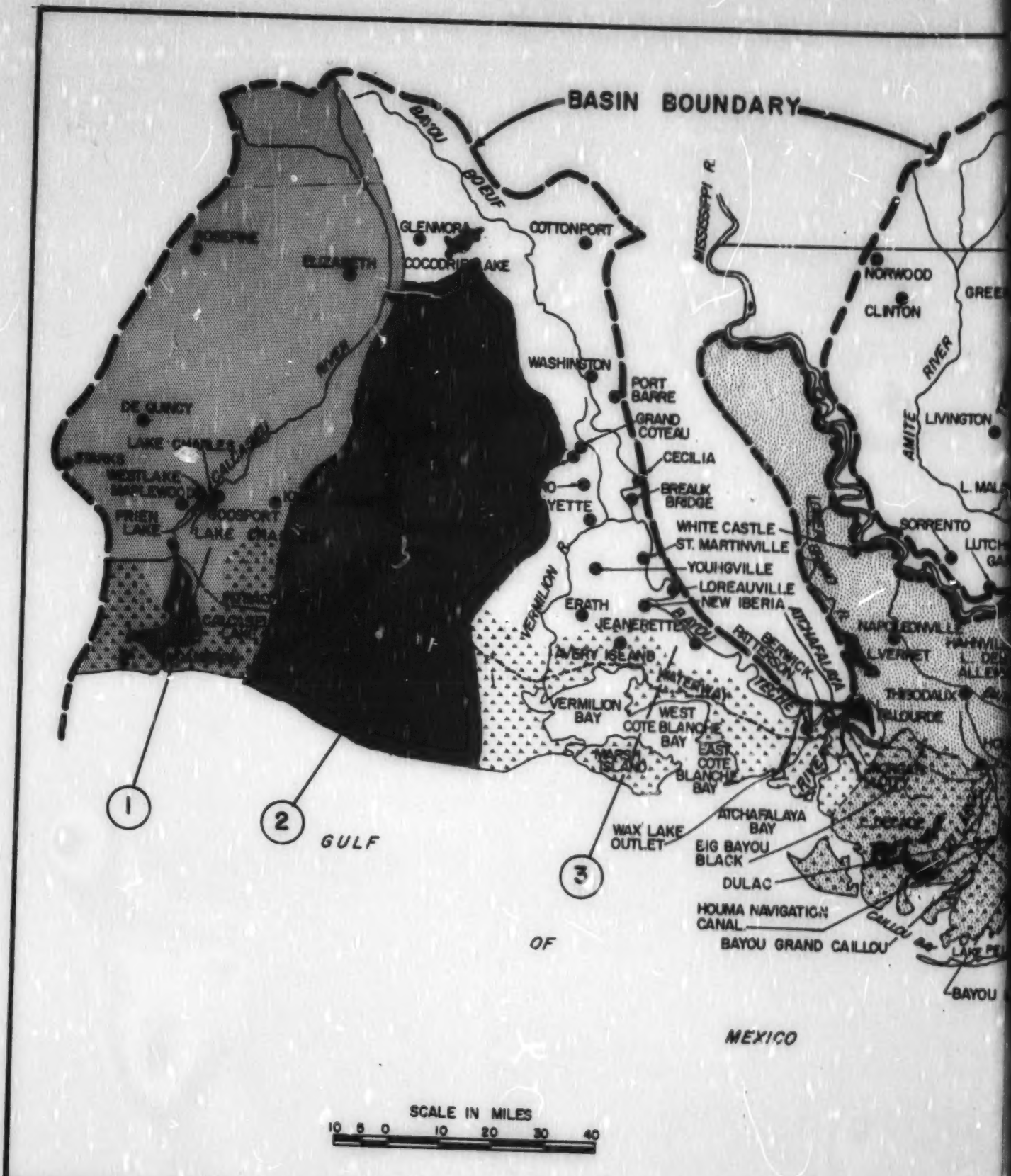
## I. Introduction

The purpose of this report is to focus attention on known sources of water pollution and to provide a priority for action to correct the existing water pollution problems and prevent future problems in the Louisiana Coastal Waters (see Figure 1). This report is based on compilation of available data of the Federal Water Pollution Control Administration, South Central Region, and the water pollution control agency of Louisiana. No detailed water quality surveys or engineering studies were carried out for the preparation of this report.

The findings of this report are based upon the best information available at this time on water quality conditions and immediate and potential water pollution abatement needs. The omission of any particular town, industry, or other establishment from this report does not imply that an immediate or potential water pollution abatement need does not possibly exist in that particular area. Priorities listed are based solely on an evaluation of the Louisiana Coastal Waters and not on a relative basis with other basins in the South Central Region.

Authority is given in Section 3 (a) of the Federal Water Pollution Control Act, as amended, for the preparation or development of comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries thereof and improving the sanitary conditions of surface and underground waters. This report, by describing the immediate needs for controlling water pollution in the Louisiana Coastal Waters represents a further step in the development of a comprehensive program to control water pollution in this basin.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ELIZABETH
JENNINGS
DE QUINCY
LAKE CHARLES
CALCASIEU RIVER
WESTLAKE
SULPHUR
MOSS LAKE
GRAND LAKE
CALCASIEU PASS
WASHINGTON
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BREAUX BRIDGE
YETTE
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JEANERETTE
AVERY ISLAND
VERMILION BAY
WEST COTE BLANCHE BAY
MARSH ISLAND
EAST COTE BLANCHE BAY
WHITE CASTLE
ST. MARTINVILLE
YOUNGVILLE
LOREAUVILLE
NEW IBERIA
BAYOU PETITE ANSE
BERWICK
ATCHAFALAYA RIVER
MISSISSIPPI R.
NORWOOD
CLINTON
AMITE RIVER
LIVINGTON
SORRENTO
NAPOLEONVILLE
L. VERRET
THIBODAUX
LOCKPORT
HOUMA
ATCHAFALAYA BAY
WAX LAKE OUTLET
EIG BAYOU BLACK
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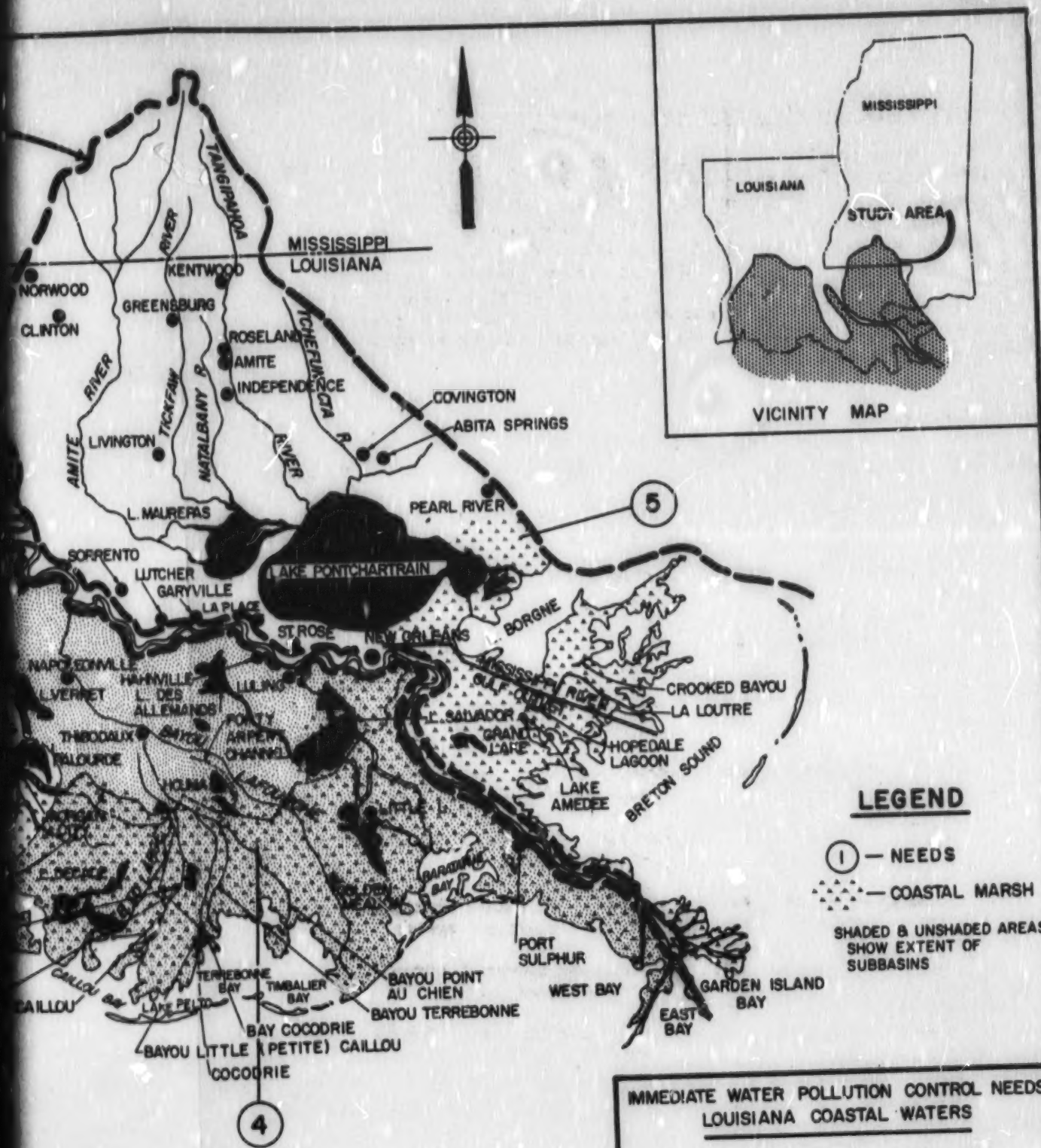


IMMEDIATE WATER POLLUTION CONTROL NEEDS
LOUISIANA COASTAL WATERS

**LOCATION MAP**

UNITED STATES DEPARTMENT OF THE INTERIOR
Federal Water Pollution Control Administration
SOUTH CENTRAL REGION APRIL 1967 DALLAS, TEXAS

FIGURE 1

## II. Summary of Immediate Pollution Control Needs

Pollution problems in the Louisiana Coastal Waters, as indicated by deterioration of oyster beds, off-flavors of fish and shellfish, fish kills, oxygen depletion, high chloride concentrations, and septic conditions result in damages to propagation of fish and shellfish, municipal, industrial, and agricultural water supply, and recreation uses. The immediate pollution needs are listed in the following tabulation and grouped into categories: waste treatment, flow regulation, other pollution control practices, institutional practices, and research. Location designations refer to sub-basins shown in Figure 1.

### Waste Treatment

| Location | Responsibility | Need | Priority |
|---|---|---|---|
| 1 | City of Rosepine, La. | Primary & secondary treatment | B |
| | City of Elizabeth, La. | Primary & Secondary treatment | B |
| | City of Oakdale, La. | Additional primary and secondary treatment | B |
| | City of Iowa, La. | Primary and secondary treatment | B |
| | City of Goosport, La. | Primary & secondary treatment sewage collection system | A |
| | City of Maplewood, La. | Additional primary & secondary treatment | B |
| | City of Starks, La. | Primary & secondary treatment sewage collection system | B |
| | City of DeQuincy, La. | Additional primary & secondary treatment | B |
| | City of Cameron, La. | Primary and secondary treatment | B |

Waste Treatment (continued)

| Location | Responsibility | Need | Priority |
|---|---|---|---|
| 1 | Calcasieu Paper Co., Elizabeth, La. | Additional treatment to remove color | A |
| | Calcasieu Paper Co., Lake Charles, La. | Additional waste treatment | A |
| | Continental Oil Co., Lake Charles, La. | Additional chemical treatment | A |
| | Olin Mathieson Chem. Co., Lake Charles, La. | Additional chemical treatment | A |
| | Hercules Powder Co. Lake Charles, La. | Additional chemical treatment | A |
| | Petroleum Chem. Inc. Lake Charles, La. | Removal of heavy metals | A |
| | Firestone Tire & Rubber Company Lake Charles, La. | Additional chemical treatment | A |
| | Cit-Con Oil Refinery Lake Charles, La. | Additional waste treatment to remove oils, phenols, organics and metals | A |
| | Cities Service Oil Corp., Lake Charles, La. | Additional waste treatment to remove oils and phenols | A |
| | Davison Chem. Co., Lake Charles, La. | Additional waste treatment to remove inorganics | A |
| | Columbia Southern Chem. Co., Lake Charles, La. | Additional waste treatment to remove acids and inorganics | A |
| | Southern Alkali Corp. Lake Charles, La. | Additional waste treatment to remove inorganics | A |
| | Louisiana Polymers Corp., Lake Charles, La. | Additional waste treatment to remove metals | A |
| | Ancon Chem. Corp. Westlake, La. | Additional chemical treatment | A |
| | Continental Oil Co. Westlake, La. | Additional chemical treatment | A |

Waste Treatment (continued)

| Location | Responsibility | Need | Priority |
|---|---|---|---|
| 1 | Continental Carbon Co. Westlake, La. | Additional chemical treatment | A |
| | Gulf Menhaden Co. Cameron, La. | Impoundment of high BOD wastes or disposal in off-shore waters | B |
| | Louisiana Menhaden Co. Cameron, La. | Impoundment of high BOD wastes or disposal in off-shore waters | B |
| | Steeds Fish Co. Cameron, La. | Impoundment of high BOD wastes or disposal in off-shore waters | B |
| | U.S. Forest Service Kisatchie Nat'l Forest near Alexandria, La. | New treatment facilities to replace existing inadequate facilities | A |
| | U.S. Bureau Sport Fisheries & Wildlife Refuge near Hackberry, La. | Package treatment plant | A |
| | U. S. Coast Guard Calcasieu Radio-Beacon Station, near Cameron, La. | Secondary treatment needed | B |
| | U. S. Corps of Engineers Calcasieu Lock near Lake Charles, La. | Chlorination facility | B |
| 2 | City of Mamou, La. | Additional primary & secondary treatment | B |
| | City of Eunice, La. | Additional primary & secondary treatment | B |
| | City of Basile, La. | Primary & secondary treatment | B |
| | City of Elton, La. | Primary & secondary treatment sewage collection system | B |
| | City of Iota, La. | Primary & secondary treatment | B |

Waste Treatment (continued)

| Location | Responsibility | Need | Priority |
|---|---|---|---|
| 2 | City of Jennings, La. | Primary & secondary treatment | B |
| | City of Mermentau, La. | Primary & secondary treatment sewage collection system | B |
| | City of Gueydan, La. | Primary & secondary treatment | B |
| | U.S. Corps of Engineers Catfish Point Control Structure, near Grand Chenier, La. | Chlorination facility | B |
| | U.S. Bureau Sport Fisheries & Wildlife Lacassine Nat'l Wildlife Refuge near Lake Arthur, La. | Package treatment plant | B |
| 3 | City of Lafayette, La. | Additional primary & secondary treatment | B |
| | City of Glenmora, La. | Primary & secondary treatment | B |
| | City of Centreville, La. | Primary & secondary treatment sewage collection system | B |
| | City of Washington, La. | Primary & secondary treatment | B |
| | City of Grand Coteau, La. | Primary & secondary treatment sewage collection system | B |
| | City of Sunset, La. | Primary & secondary treatment | B |
| | City of Church Point, La. | Primary & secondary treatment | B |
| | City of Carencro, La. | Primary & secondary treatment | B |
| | City of Cecilia, La. | Primary & secondary treatment | B |
| | City of Breaux Bridge, La. | Primary & secondary treatment | B |
| | City of Scott, La. | Secondary treatment | B |
| | City of St. Martinville, La. | Secondary treatment | B |
| | City of New Iberia, La. | Additional primary & secondary treatment | B |

Waste Treatment (continued)

| Location | Responsibility | Need | Priority |
|---|---|---|---|
| 3 | City of Avery Island, La. | Primary & secondary treatment | B |
| | City of Erath, La. | Primary & secondary treatment sewage collection system | B |
| | City of Jeanerette, La. | Primary & secondary treatment | B |
| | Parish of St. Mary S.D.#1, La. | Primary & secondary treatment | B |
| | City of Morgan City, La. | Primary & secondary treatment | A |
| | City of Patterson, La. | Primary & secondary treatment | B |
| | City of Berwick, La. | Primary & secondary treatment | A |
| | Breaux Bridge Sugar Factory, La. | Additional treatment of condenser & wash water | A |
| | St. John Sugar Factory St.Martinville, La. | Additional treatment of condenser & wash water | A |
| | Vida Sugar Factory Loreauville, La. | Additional treatment of condenser water | A |
| | Iberia Cooperative Factory, New Iberia, La. | Additional treatment of condenser water | A |
| | Duhe-Bourgeois Factory Jeanerette, La. | Additional treatment of condenser water | A |
| | Delgado Albania Factory Jeanerette, La. | Additional treatment of cane wash water | A |
| | St. Mary Sugar Factory Jeanerette, La. | Additional treatment of condenser water | A |
| | Columbia Sugar Factory Franklin, La. | Additional treatment of condenser water | A |
| | Enterprise Factory Jeanerette, La. | Additional treatment of cane wash water | A |
| | B.F. Trappey Son, Inc. Lafayette, La. | Solids removal & aeration pond | A |
| | L. A. Frey & Sons, Inc. Lafayette, La. | Additional treatment of high BOD wastes | A |

Waste Treatment (continued)

| Location | Responsibility | Need | Priority |
|---|---|---|---|
| 3 | U.S. Coast Guard Point Au Fer Reef Light Station, near Morgan City, La. | Secondary treatment | B |
| 4 | City of White Castle La. | Primary & secondary treatment sewage collection system | B |
| | City of Thibodeaux, La. | Additional primary & secondary treatment | B |
| | City of Napoleonville, La. | Additional primary & secondary treatment | B |
| | City of Raceland, La. | Primary & secondary treatment sewage collection system | B |
| | City of Houma, La. | Additional primary & secondary treatment | A |
| | City of Lockport, La. | Additonal primary & secondary treatment | B |
| | City of Larose, La. | Primary & secondary treatment sewage collection system | B |
| | City of Golden Meadow, La. | Primary & secondary treatment sewage collection system | B |
| | Parish of Terrebonne S.D., La. | Additional primary & secondary treatment | B |
| | U.S. Coast Guard Grand Isle Lifeboat station, near Grand Isle, La. | Secondary treatment | B |
| | U.S. Coast Guard Dulac Light Station near Dulac, La. | Secondary treatment | B |
| | State of Louisiana Stream Control Comm. & Public Health Dept. | Require treatment facilities for unsewered habitations along Bayous Terrebonne, Little Caillou, Grande Caillou, Dularge & Lafourche | A |

Waste Treatment (continued)

| Location | Responsibility | Need | Priority |
|---|---|---|---|
| 4 | Valentine Sugar Factory, Lockport, La. | Additional treatment of condenser water & can wash water | A |
| | Valentine Paper Mill Lockport, La. | Additional treatment & impoundment of wastes | A |
| | Southdown Sugar Mill & Refinery, Houma, La. | Additional treatment of condenser water & impoundment of can wash water | A |
| 5 | City of Kentwood, La. | Primary & secondary treatment | B |
| | City of Greensburg, La. | Primary & secondary treatment | B |
| | City of Roseland, La. | Primary & secondary treatment sewage collection system | B |
| | City of Amite, La. | Primary & secondary treatment | B |
| | City of Livingston, La. | Primary & secondary treatment sewage collection system | B |
| | City of Covington, La. | Additional primary & secondary treatment | B |
| | City of Abita Springs, La. | Additional primary & secondary treatment | B |
| | City of Pearl River, La. | Primary & secondary treatment | B |
| | City of Sorrento, La. | Primary & secondary treatment sewage collection system | B |
| | City of Lutcher, La. | Additional primary & secondary treatment | B |
| | City of Laplace, La. | Primary & secondary treatment | B |
| | City of St. Rose, La. | Primary & secondary treatment sewage collection system | B |
| | City of New Orleans, La. | Chlorination of storm water | A |
| | Jefferson Parish S.D., La. | Primary & secondary treatment | A |
| | State of Louisiana Stream Control Comm. & Board of Health | Require treatment facilities for unsewered habitations & camps on shores of Lakes Maurepas, Pontchartrain, Borgne & vicinity | A |

**Waste Treatment** (continued)

| Location | Responsibility | Need | Priority |
|---|---|---|---|
| 5 | State of Louisiana & gravel processors | Regulate gravel washing operations to protect water quality | A |
| Basinwide | State of Louisiana & FWPCA | Require treatment of sanitary wastes from vessels | A |
| Basinwide | State of Louisiana & FWPCA | Require treatment of sanitary wastes from unsewered habitations | A |
| **Flow Regulation** | | | |
| 3 | Corps of Engineers | Provide flow augmentation in the Teche & Vermillion Watersheds | A |
| | Corps of Engineers | Control structures in Wax Lake outlet to control diversion of Atchafalaya River | A |
| **Other Pollution Control Practices** | | | |
| Basinwide | Corps of Engineers & State of Louisiana | Provide for containment of spoil from dredging activities | A |
| Basinwide | Drilling companies in basin & State of Louisiana | Improve control & prevention of oil wastages & spills | A |
| Fresh Water Areas | Drilling companies in basin & State of Louisiana | Provide for subsurface disposal of brines | A |
| Basinwide | State of Louisiana & FWPCA | Conduct regular & frequent surveillance of oil mining operations to control avoidable oil wastage | A |
| Basinwide | FWPCA & Louisiana Stream Control Comm. | Maintain a continuous pesticide monitoring program | A |
| Basinwide | U. S. Department of Agriculture | Regulate use of highly toxic & persistent pesticides | B |
| Basinwide | FWPCA & other Federal agencies, and State of Louisiana | Conduct regular & frequent surveillance of watercraft to prevent accidental oil spills while loading or unloading vessels and at other times, and waste discharges from ballast and bilge water | B |

Other Pollution Control Practices (continued)

| Location | Responsibility | Need | Priority |
|---|---|---|---|
| Basinwide | Federal & State Government | Include water quality as a consideration in location of flood control, navigation, and flow augmentation canals | A |
| Basinwide | State of Louisiana & Corps of Engineers | Include water quality as a consideration in granting permits for pipe line canals & oil exploration & production canal | A |
| **Institutional Practices** | | | |
| Basinwide | FWPCA & State of Louisiana | In cooperation with other interested organizations establish & promote an effective comprehensive water pollution control & water quality management program in the basin | A |
| Basinwide | State of Louisiana | Prepare & adopt standards on intrastate streams | B |
| Basinwide | State of Louisiana | Consideration legislation to provide appropriations for state participation in grants for construction of sewage treatment works | B |
| Basinwide | State of Louisiana | Consider expansion of water quality control surveillance program (including treatment plant operation & maintenance) | A |
| Basinwide | State of Louisiana | Prepare & maintain a complete industrial waste discharge inventory for industries not connected with municipal treatment systems | B |
| Basinwide | State of Louisiana | Increase budget & staffing of agencies involved in water resources management | A |

Institutional Practices (continued)

| Location | Responsibility | Need | Priority |
|---|---|---|---|
| Basinwide | State of Louisiana | Prepare & adopt water quality standards for coast waters of the State | B |
| Basinwide | State of Louisiana | Consider legislation to require subsurfaces disposal of all brines in fresh water areas | B |
| **Research** | | | |
| Basinwide | FWPCA, Corps of Engineers & Federal & State Fish & Wildlife agencies | Conduct hydrological model studies of basin to consider effects of flood control & navigational channels in the coastal marshes & estuaries | B |
| Basinwide | Pesticide producers & U.S. Department of Agriculture | Develop pesticides which are effective but do not persist in the aquatic environment or damage aquatic biota | B |
| Basinwide | U.S. Department of Agriculture | Conduct research to provide better methods of controlling pesticide runoff from agricultural lands | A |
| Basinwide | Pulp & paper industries, universities & FWPCA | Develop means to eliminate color problems from paper mill effluent | B |

## III. Immediate Control Needs

Various measures are needed to control existing and potential pollution of the Louisiana Coastal Waters and tributaries. These measures are needed to abate septic conditions, reduce coliform bacterial densities, increase oxygen content, prevent salt water intrusions, augment fresh water flows, reduce concentrations of oils, brines, petrochemicals, and other organics and inorganics, and prevent dreding damage for the protection of water uses within the basin. These uses include municipal, industrial, and agricultural water supplies; propagation of fish, shellfish, and wildlife, and recreation.

The actions recommended here though not all encompassing are, however, prerequisite to good water quality planning and should be included in local, state, and federal programming for water pollution control. Background for these immediate needs is summarized in Chapter VI.

### Waste Treatment

Sub-basin 1. New or expanded waste treatment facilities are needed for at least nine communities and four federal facilities in the Calcasieu sub-basin. The City of Goosport should take immediate action in providing these facilities so as to reduce the bacterial pollution of Lakes Charles and Prien. In addition, thirteen petrochemical companies and/or oil refineries in the Lake Charles-Westlake area are discharging complex wastes into the Calcasieu drainage basin. These wastes are known to include oils, phenols, sulfides and sulfates, chromates, iron, chlorides, nitrates, rubber, and ketones, and should be adequately treated or impounded to prevent further pollution of the stream. The paper mill at Elizabeth, Louisiana, presently discharging inadequately treated wastes into Mill Creek, a distributary of the Calcasieu River, needs larger impoundments or better waste treatment facilities to reduce the sulfates, sulfites, and color.

The three menhaden processing plants near Cameron periodically cause problems with their high B.O.D. wastes and solids. Better screening, recycling of pumping water, and chlorination facilities should be provided by these companies. Bilge waters should be disposed of in open gulf waters or adequately treated onshore prior to discharge.

Sub-basin 2. Eight communities and two federal installations in the Mermentau River and tributaries sub-basin need to provide additional or new sanitary waste treatment facilities.

Sub-basin 3. In the Teche-Vermillion watershed, the communities of Berwick and Morgan City need to provide immediately, new or additional treatment facilities to reduce the bacterial contamination of the oyster beds in Atchafalaya bay. Eighteen other communities need to provide new or additional treatment facilities. Nine raw sugar factories need to reduce the B.O.D. of their condenser waters either by improving their operating efficiencies, recirculating the condenser water, or by providing adequate treatment facilities. Three of the factories also need to enlarge their impoundments to contain their cane wash water. The two food processing plants should provide new or improved facilities for treating or impounding their wastes to reduce solids and B.O.D.'s.

Sub-basin 4. The City of Houma, Terrebonne Parish, needs to provide additional stabilization facilities and lift stations for use during periods of heavy rainfall. The State of Louisiana should require that the many unsewered habitations and camps along the lakes and bayous south of Houma provide some form of waste treatment. The Valentine Sugar Mill near Lockport and Southdown Sugar Mill and Refinery near Houma need to provide additional treatment facilities or impoundments to contain their condenser waters and other wastes. The Valentine Paper Company in Lockport should construct additional facilities to handle its wastes. Ten other communities need new or additional facilities for waste treatment.

Sub-basin 5. East Jefferson Parish needs to rapidly develop its sewerage system to prevent further bacterial contamination of Lake Pontchartrain. The City of New Orleans should treat its storm water before pumping it into Lake Pontchartrain. The State of Louisiana should require treatment or chlorination facilities for the unsewered habitations, camps, marinas, and boats in or along the periphery of Lake Pontchartrain and in the coastal marshes south of the lake. The thirteen other communities listed in the summary need new or additional treatment facilities. The gravel companies on the tributaries north of Lakes Pontchartrain and Maurepas need to provide settling basins for their gravel wash waters to prevent muddying of the streams. The State should provide for improved regulations of such operations.

Basinwide. There is a need for treatment of sanitary wastes from boats, camps, and other unsewered habitations in the Coastal Waters to protect the oyster growing waters.

## Flow Regulation

The U. S. Army Corps of Engineers needs to provide flow augmentation in the Teche-Vermillion drainage. The plan submitted by the Division of Water Supply & Pollution Control, Department of Health, Education and Welfare (predecessor to FWPCA) should be developed as rapidly as possible. The water which is to be diverted from the Atchafalaya River through several control structures is needed to provide dilution of municipal and industrial wastes, prevent salt water intrusion from the Gulf of Mexico, and provide a dependable water supply in the basin for municipal, industrial, and agricultural use.

A control structure is needed in Wax Lake Outlet to prevent additional diversion of Atchafalaya River water away from the Morgan City-Berwick area.

## Other Pollution Control Practices

The U. S. Army Corps of Engineers should provide for the containment of spoil from their dredging operations. This spoil should be placed on land when possible or contained within dikes to prevent its dispersion in the marshes and estuaries. Canals should be designed so as to maintain normal tidal fluctuations.

The oil and gas drilling companies in the basin need to follow recognized good-housekeeping practices such as providing sumps with oil gathering and collecting devices, skimming tanks before discharging oil field brines, inspecting gathering lines at regular intervals, and providing fire walls around tank batteries. To prevent further damages the companies should dispose of all oil field brines by subsurface injection.

A more aggressive enforcement of the State's pollution laws coupled with increased surveillance and inspection is needed to abate pollution from oil and drilling operations. Because of limited budget and staffing of state agencies which is unlikely to be corrected immediately, and the magnitude of the problem, the FWPCA should provide support, if requested, in surveillance and inspection activities.

The Federal Water Pollution Control Administration should maintain a continuous pesticide monitoring program in the basin to provide advance warning of toxic levels of pesticides from agricultural and manufacturing sources. The U. S. Department of Agriculture should regulate the use of highly toxic and/or persistent pesticides.

An aggressive enforcement of the Federal laws coupled with the initiation of regular and frequent surveillance of watercraft to prevent accidental oil spills while loading or unloading vessels and while vessels are en route, and oil discharges from ballast and bilge water need to be initiated by FWPCA in cooperation and in conjunction with other Federal and State agencies. The FWPCA should take the lead in such activities and in the coordination of the other activities of other agencies.

The location and physical characteristics of pipe line, oil exploration, and production canals and navigation and flood control canals can adversely affect water quality by lowering or raising water levels, changing water distribution patterns, introducing turbid water to lakes, estuaries, and marshes, and causing salt water intrusions. Water quality in the Louisiana Coastal Waters is affected by the location of and physical characteristics of these canals, such as the placing of spoil openings to other water bodies, etc. The State of Louisiana should investigate and control the physical characteristics of these canals so that the proper water quality needed to maintain and increase the fish, shellfish, wildlife, and recreational resources of the marshes and estuary is maintained. Also, in some instances the physical attributes of canals already in existence should be modified. In many cases, the locations and physical characteristics of these canals needed to protect water quality is obvious; however, in other instances these factors need to be based on hydrological model simulation, water quality, and ecological studies, which should be undertaken by FWPCA and other State and Federal agencies.

Institutional Practices

An effective comprehensive water pollution control and water quality management program is needed for the basin. The FWPCA should promote an overall plan in which all legitimate beneficial uses of water would be considered by all State and Federal water resource agencies concerned with the basin.

To strengthen the state's position on prevention, control and abatement of stream pollution, water quality standards are needed on intrastate streams. State participation is needed in the waste treatment plant construction grants program to accelerate the construction of needed improvements. Increased surveillance and operation inspection of sewage and industrial waste treatment plants are needed to locate and identify existing or potential serious pollution problems. For more rigid control over industrial pollution and aid in solving complex stream quality problems, a complete and up-to-date inventory

is needed of industrial waste discharges to basin waters, listing quantity and quality of effluent and other pertinent data.

The State of Louisiana should consider legislation to require subsurface disposal of all oil field brines in fresh water areas.

Research

The FWPCA should in cooperation or conjunction with other Federal and State water resource agencies conduct studies using environmental simulation techniques as well as water quality, flow patterns, and ecology studies of the Louisiana Coastal Waters in order to determine the effects of proposed channel developments, flow regulations, fresh water diversions, and other construction activities on the fish, shellfish, wildlife, and outdoor recreation resources of the basin. Studies should be conducted by the FWPCA to furnish information needed to evaluate the effects of the location and physical characteristics of present and proposed pipe line canals, oil exploration and production canals, and navigation and flood control projects.

There is a need to develop and promote the use of new pesticides which are toxic to specific organisms, but have little or no effect on aquatic life and are short-lived in the aquatic environment. The use of these agricultural materials, following their development, should be promoted by the U. S. Department of Agriculture. There is a further need for research by the U. S. Department of Agriculture in controlling pesticide runoff from agricultural lands.

The control of color in the treated paper mill effluent has been a perplexing problem for a number of years. Research and development is needed to provide a less expensive process for color removal than that currently available. This research should be a coordinated effort of the paper industry, FWPCA, and state water pollution control agencies, utilizing the resources of all, as well as university research programs.

An industrial waste survey must be made in the highly industrialized Lake Charles area to determine the nature and quantities of the waste from the large petrochemical industry. The effects of these wastes on the ecology of coastal marshes and estuaries should be determined.

IV. Costs

The estimated cost of pollution control measures listed in the summary table is shown in the following tabulation:

| Item | | Estimated Cost |
|---|---|---|
| Municipalities: | | |
| New treatment facilities | | $ 8,500,000 |
| Expansion of treatment facilities | | 3,700,000 |
| | Sub Total | $12,200,000 |
| Federal Installations: | | |
| Improvements or additions to treatment facilities | | 128,500 |
| | Sub Total | $12,328,500 |
| Industrial: | | |
| Waste surveys | | Not determined |
| Flow Augmentation: | | |
| Teche-Vermillion Basin | | $ 5,100,000 |
| | Sub Total | $17,428,500 |
| Increased Surveillance | | Not determined |
| | TOTAL | $17,428,500 |

V. Recent Progress in Pollution Control

The State of Louisiana through stricter enforcement of its water pollution laws has eliminated some of the surface pollution from oil field brines. Industrial pollution from raw sugar mills has also been reduced considerably.

The FWPCA has established the LMRCP which includes the Louisiana Coastal Water area.

The U. S. Army Corps of Engineers now pumps Mississippi River water into Bayou Lafourche, providing an additional fresh water source to the area.

The City of New Orleans has requested and received a demonstration grant for chlorination of its storm waters. Aided by Public Law 660 grants, many communities in the basin have constructed and/or made improvements to municipal waste treatment plants.

## VI. Background

### Pertinent Basin Characteristics

### Coastal Marshlands and Estuaries

The Gulf Coast marshes comprise approximately one-third of the area designated in this report as Louisiana Coastal Waters. This marshland area is composed of approximately 6,000 square miles of salt water marshes which range in elevation from minus 2 ft. to 2 ft. above sea level. Salinities range from fresh water to 90% sea water, and soils range from solid clay to 80% organic material. The annual mean temperature for the coastal region is approximately 68°F and annual rainfall is approximately 60 inches. The normal tide from mean low to mean high is approximately 18", though tides are controlled more by wind in the Gulf Coast marshes than by the normal moon and sun attraction. Equinoctial storm tides ranging from 2 ft. to 4 ft. above mean high tide level occur generally two to three times annually somewhere along the coastal marshes with salinities ranging from 10% to 100% seawater. The marshlands are interlaced with natural lakes, bayous, sloughs and bays.

Extensive gas and oil mining operations are located throughout the coastal marshes, estuaries and offshore waters. A large network of canals have been constructed to provide access to these projects and have significantly affected the normal edaphic conditions of this region. Heavy boat and barge traffic results from these operations. The Coastal Waters of Louisiana are highly productive of fish and shellfish and support a large fishing industry. Approximately 794 million pounds of fish and shellfish were caught commercially in 1965 in Louisiana - the largest part of this from the Coastal Waters - valued at approximately $40 million. These areas are also a valuable recreational resource. There is extensive sport fishing, hunting and trapping operations in the lower two-thirds of the basin.

In order to provide access to oceangoing and/or shallow draft vessels to the large cities along the coast, several navigation canals have been constructed in recent years (see the following section on Present Water Quality Problems). The Intracoastal Canal extends almost the full length of the Louisiana coast. All of these projects have altered in some way the ecological and physical characteristics of the marshes.

### Sub-basin 1

The Calcasieu River rises in Vernon Parish near the western boundary of Louisiana. It flows in a southerly direction to the Gulf

of Mexico, entering the Gulf about 30 miles east of Sabine Pass. The stream is about 215 miles long and embraces a drainage area of about 4100 square miles. The stream enters Lake Charles about 45 miles above its Gulf outlet. Below Lake Charles the stream becomes a tidal estuary. Two fresh water lakes are formed in the vicinity of Lake Charles and are popular recreational areas. Approximately 15 miles south of Lake Charles the stream enters Calcasieu Lake which is about 25 miles above its Gulf outlet. This lake is about 18 miles long. From Calcasieu Lake to its Gulf outlet the stream is known as Calcasieu Pass. Principal tributaries are Whiskey Chitto Creek, Barnes Creek and West Fork.

The stream is navigable for 97 miles above its Gulf outlet. The source of the Calcasieu is in the Kisatchie Escarpment with heights of 350 to 400 feet above mean sea level. The Gulf Coast in the vicinity of the Calcasieu River is in a cycle of subsidence and encroachment by the Gulf, with practically no alluviation in progress. The area above Lake Charles is suitable for agriculture, with cotton, corn, rice, and peanuts as the principal crops. The area farther east is devoted to considerable rice culture which accounts for large quantities of surface water use. Climate and rainfall are similar to that described in the coastal marshes. The major industrial development in this sub-basin is related to petroleum production. There are numerous oil and gas fields in the basin, and an extensive petrochemical complex in the Lake Charles area. Rice mills, paper mills, food processing, and salt mining are the other major activities. Oysters are harvested in the estuary.

Navigation is important in the Calcasieu River below Lake Charles. Above Lake Charles, the stream is navigable to shallow draft vessels. The port at Lake Charles is accessible to oceangoing ships and is a major factor in the economic development of the region.

The following table indicates recorded average, maximum and minimum stream flows at various gaging stations:

| Gaging Station | Drainage Area (square miles) | Years of Record | Stream flow (c.f.s) | | |
|---|---|---|---|---|---|
| | | | Average | Maximum | Minimum |
| LOUISIANA | | | | | |
| Calcasieu River-- | | | | | |
| Oberlin.. | 753 | 11 | 1,337 | 34,700 | 42 |

Table (Continued)

| Gaging Station | Drainage Area (square miles | Years of Record | Stream flow (c.f.s.) Average | Maximum | Minimum |
|---|---|---|---|---|---|
| Kinder..... | 1,700 | 11 | 3,024 | 68,000 | 200 |
| Whiskey Chitto Creek---- Oberlin.. | 510 | 8 | -- | 35,000 | 102 |

Sub-basin 2

This sub-basin is drained by the Mermentau and its principal tributaries, Bayous Nespique, des Cannes, Plaquemine, and Queue de Tortue, is approximately 3000 square miles in area. The basin is bounded on the north and east by the Vermillion-Teche sub-basin, on the west by the Calcasieu River divide, and on the south by the Gulf of Mexico. It rises below an escarpment along the northern boundary and flows generally southward across the gently sloping gulf plain to the Gulf of Mexico. Stream slope is flat, and the flow in its lower reach is ill-defined and is affected by tides or heavy runoff flows. Interconnecting channels are common in the lower reaches. The plains give way to extensive salt marsh areas and inland lakes. The geological characteristics of the coastal plain is that of subsidence.

No discharge measurements are available on the main stem of the river.

Rice culture is the major economic activity in the area because of the considerable surface water available. There are a large number of oil fields located throughout the sub-basin.

Sub-basin 3

This sub-basin is bounded on the west by the Mermentau, on the north by the Red River divide, on the east by the west levee of the Atchafalaya River, and on the south by the Gulf of Mexico. The topography and geology of the basin is similar to that of the Mermentau sub-basin.

Bayou Teche is a small stream (called Bayou Bouef in its northern reach) which flows along the highest part of an alluvial ridge and

serves an agricultural area that is intensively farmed, sugarcane and rice being the principal crops. Minimum and maximum flows are 61 and 4650 cfs at Arnaudville and 0 and 2510 cfs at Keystone Lock near St. Martinville. The lesser flows are caused by diversion of Teche waters to the Vermillion River and Lake Fausse Point. Contrary to normal conditions, all local drainage is away from the stream, and its functions as a flume, conveying water to the Vermillion River. It is navigable from its mouth to mile 105 at Arnaudville.

The Vermillion River on the other hand has a well defined basin, containing 650 square miles, and acts as a distributary of Bayou Teche. The river is navigable from mile 0 to Lafayette at mile 48.7. Total flow in the system at Arnaudville varies from a maximum weekly average of approximately 2,200 cfs to about 100 cfs. Agriculture is devoted to rice, sugarcane and sweet potatoes. Fishing is also important to the area's economy. Gas and oil mining operations are extensive in the area. There are 16 raw sugar mills located along the Teche and Vermillion.

The Lower Atchafalaya River flows into the Gulf of Mexico in the eastern section of this sub-basin. The original channel, on which the cities of Morgan City and Berwick are located, no longer receives all of the Atchafalaya River flow. Wax Lake outlet - a direct, man-made outlet to the Gulf - diverts a large portion of the Atchafalaya River flow. This decrease in flow has resulted in damage to the municipal water supplies of Morgan City and Berwick.

Sub-basin 4

This sub-basin is bounded on the west by the east Atchafalaya levee, on the south by the Gulf of Mexico, and on the east and north by the west levee of the Mississippi River. The terrain of the sub-basin is extremely flat, marshy, and interlaced with many poorly defined streams. The soils of the area are very fertile and particularly suited for the growth of sugarcane. The total area is approximately 4600 square miles. Although bounded by both the Mississippi and Atchafalaya Rivers, there is no natural drainage to these rivers because of the levee systems. All drainage is south toward the Gulf. The Houma Navigation Canal provides direct access of shallow draft vessels from the Gulf to the Intracoastal Canal at Houma. The other main waterways in this sub-basin are the Eastside Atchafalaya Landside Drainage Canal which drains the northern portion of the sub-basin above White Castle; Bayou Lafourche which receives Mississippi River water from a pumping station at Donaldsonville, and is the only stream in this basin with a consistent flow, Bayous

DuLarge, Grand Caillou, Little Caillou, Terrebonne, and Point AuChien south of Houma, which drain the southern portion of the sub-basin, and have no flows except that which comes from rainfall runoff. The lower reaches of all these streams are tidal estuaries.

The economy of the region is dominated by sugarcane culture, oil and gas mining, and related industries, and commercial fishing (shrimp, oysters, and menhaden). There is considerable sport fishing activity in this area.

Sub-basin 5

This sub-basin is approximately 6200 square miles. It is bounded on the west by the east Mississippi River levee, on the north by the Thompson Creek Drainage basin, on the east by the Pearl River basin and on the south by the Gulf of Mexico. It is dominated by a system of three shallow lakes whose drainage flows southeast into the Gulf of Mexico. Lake Maurepas is fresh water, Lake Pontchartrain brackish, and Lake Borgne a tidal estuary.

The five principal rivers - Amite, Tickfaw, Natalbany, Tangipahoa, and Tchefuncte - flowing into Lakes Maurepas and Pontchartrain, drain relatively unindustrialized, forested rural areas. They are all of small to moderate flow and contain water of relatively high quality.

Agriculture in this sub-basin is limited and is confined largely to sugarcane culture along the Mississippi River. The south shore of Lake Pontchartrain is bordered by the City of New Orleans and heavily populated East Jefferson Parish.

Commercial fishing, oyster harvesting and oil and gas mining are extensive in the coastal marshlands.

Present Water Quality Problems

Because of the diversity of the problems and the topography, the study area has been subdivided into sub-basins (see Figure 1). Problems pertinent to the entire coastal marshes and to each of the sub-basins are discussed in the following paragraphs.

Coastal Marshes - Estuaries

There are a few problems which are widespread and common to the entire basin, and particularly to the coastal marshes. Oil wastage and

spillage from wells, barges, pipelines, and pumping installations are a constant threat to the aquatic biota and the aesthetic value of the estuary and marshes. These oil spills cause off-flavors in fish and shellfish as well as damage to the propagation grounds of shellfish and many types of game and commercial species of fish. The many access and pipeline canals constructed by the drilling companies increase salt water intrusion, interfere with water interchange, destroy fisheries habitat, increase turbidities with subsequent damage to the fish and wildlife resources of the estuary.

Several major water control projects in the coastal waters for navigation and flood control have resulted in direct and indirect damages to the fish, shellfish, wildlife and recreational resources of this area.

In general, these projects increase salt water intrusion which in turn damages fish and shellfish habitats. Silt from land runoff is introduced directly into the fish and shellfish habitats with subsequent damage. Actual construction often destroys valuable oyster beds and expanses of marshland, and spoil from dredging causes additional damage.

Specific projects and their effects are listed in Table 1.

The extensive vessel traffic throughout the basin from oil and gas mining operations and commercial and sport fishing contributes unknown but significant quantities of sanitary wastes to the water. These are potential health problems for contact sports, water users, and consumers of fish and shellfish.

Coliform bacteria from upstream sources, e.g., the City of New Orleans, and unsewered habitations located throughout the area are a constant threat to the oyster growing areas. The Louisiana Health Department has conducted a series of oyster water surveys, and their findings indicate that the overall condition of the oyster growing waters is good from the public health viewpoint. There are several areas where the coliform counts exceed the public health standards and these areas are closed to oyster harvesting. (See the following sub-basin problems).

Sub-basin 1. The Calcasieu River, its tributaries, and the estuarine areas into which they flow have in the past been plagued by oxygen depletion and high bacterial counts due to the lack of or inadequate municipal treatment facilities. This pollution interfered with the recreational uses of Lakes Charles and Prien and caused the closure of oyster beds in Calcasieu Lake. Since 1946 the overall pollution

TABLE 1

## MAJOR WATER CONTROL PROJECTS IN LOUISIANA THAT HAVE EFFECTED AND ARE EFFECTING FISH AND WILDLIFE RESOURCES

| *Name of Project* | *Type* | *Status* | *Description* | *Effect* | |
|---|---|---|---|---|---|
| | | | | *Direct* | *Indirect* |
| Barataria Bay Waterway | Navigation | Complete | A 125 feet wide by 12 feet deep channel from the Gulf Intracoastal Waterway to Barataria Pass. | Losses to oyster resources by dredging across existing leases. | Current alteration and wide spread silting over adjacent oyster beds. |
| Petit Anse, Tigre and Carlin Bayous | Navigation | Complete | A channel 80 feet wide by 9 feet deep in each Bayou to Vermilion Bay. | Actual construction operation initially increased turbidity and destroyed the natural regimen of these bayous. | Increased saltwater intrusion and changed the ecological characteristics of the marshes adjacent to the project. |
| Atchafalaya River | Navigation & Flood Control | Active | Entire Atchafalaya Flood Control complex from Old River to Atchafalaya Bay and especially the main stem of the river. | Overflow has been drastically reduced or effectively eliminated. This has harmed fish and wildlife resources. Spoil from continued dredging has filled fishing lakes and bays. | Channel closures altered water exchange patterns and decreased fish and wildlife production. Frequency of overflow reduced by cross-channel closures, backwater effect reduced in some areas of the basin. |
| Calcasieu River and Pass | Navigation | Active | A channel 400 feet wide by 40 feet deep from the Gulf of Mexico to the port of Lake Charles. | Increased saltwater intrusion over a wide area. Damages to fisheries habitat due to dredging and other construction operations. | Ecological changes in the surrounding marshes. Reduction in quality of habitat for waterfowl, furbearers and other wildlife species. |
| Mississippi River Gulf Outlet | Navigation | Active | A channel 500 feet wide by 36 feet deep from the Gulf of Mexico to New Orleans. | Actual construction destroyed vast expanses of marshland that were valuable wildlife areas. Provided saltwater intrusion all the way to New Orleans and Lake Pontchartrain. Oyster beds were destroyed by dredging. | Ecological conditions were adversely effected on a vast area of marshland adjacent to the new channel. Water patterns were altered and silt or dredged material covered and destroyed other important and valuable oyster areas. |
| Freshwater Bayou | Navigation | Active | A channel 125 feet wide by 12 feet deep between the Gulf Intracoastal Waterway and the Gulf of Mexico. | Destruction of valuable waterfowl and furbearer habitat by channel construction. | Potential saltwater intrusion. Dewatering effect on adjacent marshlands. |
| Amite River and Tributaries | Flood Control | Active | Enlargement of Amite River by channel clearing, snagging and enlargement. | Destruction of existing fisheries habitat and natural stream regimen. | Lowering of water stages and altered the natural ecological character of this stream. Changed the natural productiveness of this stream. |
| Mermentau River | Navigation | Active | A channel 100 feet wide by 9 feet deep from Grand Lake to the Gulf and from Grand Lake to Bayous de Canes and Nezpique and Plaquemine Brule. | Saltwater intrusion below catfish lock. | Altered marsh ecology and reduction in habitat quality. |
| Tchefuncte-Bogue Falaya River | Flood Control | Under Survey | Clearing and snagging in upper reaches above La. Hwy. 21. | Destruction of fisheries habitat by removing trees and logs. | Rapid and violent stage changes will reduce fisheries resources. |
| Tangipahoa River | Flood Control | Under Survey | Clearing and snagging and realignment from the mouth to above Hwy. 21 Bridge. | Destruction of fisheries habitat by removing trees and logs. | Rapid and violent stage changes will reduce fisheries resources. |
| Tickfaw River | Flood Control | Active | Clearing and snagging of 16 miles above the mouth. | Destroy fisheries habitat and increased turbidity. | More rapid stage fluctuations. Reduced fish production. |
| Plaquemine Lock | Water Diversion | Under Survey | Improve Plaquemine Lock for water diversion from Mississippi River. | Eliminate stagnation and improve surface water conditions. | Improve fish and wildlife habitat with improved water quality. |

picture has improved in spite of the rapidly increasing population. Periodically, following heavy rainfalls, Lakes Charles and Prien are still contaminated by coliform bacteria coming primarily from surface runoff from the unsewered Goosport area. When treatment facilities for this community are provided, this situation should improve. Most of the Calcasieu Lake has been conditionally approved for oyster harvesting since 1962.

The most pressing pollution problems in this watershed are those caused by the petrochemical complex in the Lake Charles-Westlake area. The industries (see list in summary section) in this area discharge complex wastes which produce off-flavors in fish and shellfish, damage the aesthetic value of the water, and are the source of unknown and potentially toxic chemicals. A section of Calcasieu Lake is permanently closed to oyster harvesting because of these wastes and the possibility of chance contamination from the heavy vessel traffic in the waterway. The long term effects of these wastes on the estuary ecosystem is largely unknown.

The paper mill near Elizabeth, Louisiana, contributes sulfates, sulfites, and color to Mill Creek causing fish kills and aesthetic damage to the Calcasieu River.

The menhadden processing plants near Cameron, Louisiana, periodically discharge high B.O.D. wastes and solids to the waterway. These cause oxygen depletion and aesthetic damage.

Sub-basin 2. The principal problems in the Mermentau drainage basin are those associated with oil and gas drilling operations and related activities. Surface pollution of oil and brines cause damage to the biota of the streams, to their value as irrigation water for rice, and to their aesthetic values. These problems are localized and are found principally in the areas above Lake Arthur. The river and its tributaries furnish irrigation water for a considerable acreage of rice and are as a whole of satisfactory quality. The Lower Mermentau and Grand Lake are tidal estuaries and serve primarily for navigation, fish propagation, and recreational use. The water in this area is unsuitable for municipal and industrial use because of natural salt water intrusion.

Sub-basin 3. The principal problems in this drainage basin are those associated with raw sugar mill wastes, industrial wastes from food processing, domestic sewage, and low flows. The industrial and municipal wastes contribute B.O.D., bacteria, and a variety of chemical constituents. Because the terrain is extremely flat and much of the

natural flows into the basin have been altered by levees and canals connected with the development of the Atchafalaya Floodway, the basin's pollution problems are intensified by low flows. In addition, large withdrawals of water for rice culture affect water quality by reducing the amount of water available for the dilution of wastes.

The low flow problem is severe in Bayou Teche in that portion between Wax Lake Outlet and the Atchafalaya River. The water supply for the Cities of Morgan City and Berwick which comes from the lower Atchafalaya River has become degraded by excess color and taste, and high chlorides. These problems are attributed largely to low flows caused by the diversion of the Atchafalaya River through Wax Lake Outlet. This results in salt water intrusion during low flow periods. A proposed enlargement and extension into the Gulf of the lower Atchafalaya River channel by the Corps of Engineers will undoubtedly intensify this problem.

The increased flows of fresh, silt-laden water from the Wax Lake Outlet has severely reduced oyster production in Vermillion Bay in the last twenty years.

The untreated sanitary wastes from the Morgan City-Berwick area have caused the closure of the oyster beds near Point AuFer in Atchafalaya Bay.

Sugar cane agriculture is extensive in this area and pesticides, particularly endrin, cause numerous fish kills during the growing season.

The high B.O.D. wastes from nine of the sixteen raw sugar mills in this area (see summary section) periodically cause oxygen depletion and septic conditions resulting in fish kills.

Sub-basin 4. The characteristic low flows in the bayous of this watershed tend to intensify the pollution problems. Agricultural pesticides from rainfall runoff cause local fish kills in the bayous and canals bordering the sugar cane fields. Two of the fourteen raw sugar mills, Southdown in Houma and Valentine in Lockport, have discharges high in B.O.D. and periodically cause problems of oxygen depletion and septic conditions in the waterways.

Overflows from the Houma and Terrebonne Parish sewage treatment plants and from nearby sewer districts, particularly during prolonged wet weather, and drainage from the unsewered habitations and boats in and along the bayous and lakes south of Houma are responsible for

dangerously high bacteria counts in the oyster growing waters in the Dulac-Cocdrie vicinity. These areas are now closed to oyster harvesting. These same sources of pollution are believed to cause high bacteria counts in the lakes south of Houma and have prevented them from being developed into recreational areas by the parish. The City of Houma, Terrebonne Parish, depends upon the Intracoastal Canal and Bayou Black for its municipal water supply. High chlorides and dissolved solids resulting from salt water intrusions from the Gulf of Mexico entering through the Houma Navigation Canal are seriously degrading the water quality. Other streams in the area, such as Bayou Black and Bayou Terrebonne, are similarly affected. These water sources are highly colored from decaying vegetation in the marshes of the area.

The Valentine paper mill near Lockport causes oxygen depletion and contributes toxic wastes to the Forty Arpent Canal which is connected to Bayou Lafourche by the Intracoastal Canal.

Sub-basin 5. The tributaries north of Lakes Pontchartrain and Maurepas are relatively free of pollution problems. Unsewered communities contribute some bacteria and B.O.D. but are not believed to seriously affect the lakes. Some gravel washing operations cause muddying problems in the Amite and Tangipahoa Rivers.

The industries on the western side of the lakes along the Mississippi River discharge their wastes primarily to the Mississippi River. The five or six industries which do discharge wastes into the lake drainages, however, are not causing any obvious problems in the lakes. This is undoubtedly due to the large assimilative capacity of the swamps into which these wastes drain.

Sanitary wastes from East Jefferson Parish and from unsewered camps, houses, marinas, and boats in and along the periphery of Lake Pontchartrain as well as sewage - contaminated storm water from the City of New Orleans (see Lower Mississippi River Report for details) causes bacterial pollution in the lake. This has resulted in the closing of the lake's south shore to swimming several times in recent years.

Unsewered habitations along Bayou LaLoutre, south of Lake Borgne, cause excessive bacteria counts in three oyster-growing areas, Hopedale Lagoon, Lake Amedee, and Crooked Bayou, and as a result, these water-bodies are closed to oyster harvesting.

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